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ABSTRACT

The effect of two student characteristics (sex and grade point average) and two class variables (educational level and expected grade) were investigated as they pertain to the validity of college student ratings of teaching effectiveness. Students completed the Teacher Effectiveness Questionnaire (TEQ) the last week of the semester. The TEQ yielded scores on three factors: teaching style, class organization, and workload. Results suggest that student and class characteristics do influence end-of-course ratings of instructors. Significant effects for the educational level and expected grade variables were found as well as significant sex by expected grade interactions. (GK)

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The Influence of Selected Student and Class Characteristics on Teacher Effectiveness Ratings

Nona Tollefson, D.B. Tracy, C.R. Barke´, J. Kaiser

The validity of student ratings as measures of teaching effectiveness is being questioned by university instructors. Instructors are concerned that student ratings are influenced by factors which the instructor cannot control. These factors include student characteristics such as ability level and desire to take the class, and class characteristics such as class size and class level. The present study investigated the effect of two student characteristics, sex and grade-point-average, and two class variables, educational level and expected grade. Students completed the Teacher Effectiveness Questionnaire (TEQ) the last week of the semester. The TEQ yielded scores on three factors: Teaching Style, Class Organization, and Workload. Data were analyzed using analysis of variance procedures. Significant effects for the educational level and expected grade variables were found as well as significant sex by expected grade interactions.

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The Influence of Selected Student and Class Characteristics on Teacher Effectiveness Ratings

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Student evaluations of instruction influence salary recommendations and promotional decisions at many colleges and universities. Therefore, questions of the validity of student ratings as measures of instructional quality are being raised (Machlup, 1979: Marsh, Overall, & Kesler, 1979; Rashin & Plante, 1979). Of particular concern is the influence of class characteristics, specifically class level, class size, required vs. elected classes, and student's expected grade.

Research relating class size to effectiveness ratings has yielded mixed results. Aleamoni and Graham (1974) and Villano (1975) found ratings were independent of class size. Tollefson nd Tracy (1979) found that award winning teachers taught very large classes and earned high effectiveness ratings. Elmore and Pohlman (1978) and Marsh, Overall, and Kesler (1979) in a university-wide study of course evaluations for 174 classes found that high effectiveness ratings were associated with small class size.

Whether a class is elective or required also exerts a powerful influence on teacher effectiveness ratings. Teachers of elective courses were found by Centra (1978), Gage (1961), Lovell and Haner (1955), and Pohlman (1975) to be given higher student ratings than teachers of required courses.

The research on the effect of grading practice on teacher ratings has produced mixed results. McKeachie (1979) and Palmer, Carliner, and

Romer (1978) report no significant grading effect on ratings. However, recent studies by Hoffman (1978) and Worthington and Wong (1979) reported a low, but statistically significant correlation between expected grade and instructor ratings with lower ratings given to instructors assigning lower grades.

Purpose of the Study

The present study investigated the effect of two student variables (sex and grade-point-average) and two class variables (educational level and expected grade) on student evaluations of teacher effectiveness. The paper reports the results of three factor analyses of the Teacher Effectiveness Questionnaire (TEQ), the dependent variable in the study, as well as the results of a study designed to assess the effect of student and class characteristics on end-of-course TEQ ratings.

Phase 1: The Development of the Teacher Effectivenss Questionnaire (TEQ)

The Teacher Effectiveness Questionnaire is a 43 item Likert scale. Students respond to each item using a 5 point scale. The end points of the scale are: "The best I have ever had" and "below average." The items on the TEQ are high inference items. Sample items are:

The instructor clearly explains the objectives of the course.

The instructor provides meaningful critiques of students' work.

The instructor maintains definite standards for student performance.

The TEQ was administered initially to a sample of 282 students enrolled in an undergraduate measurement class in the School of Education. The sample included 104 males and 178 females. The sample included no freshman, 27 sophomores, 138 juniors, 50 seniors, and 14 graduate students.

(Fifty-three students failed to indicate their educational level.) Students completed the TEQ at the end of the semester.

The TEQ data were factor analyzed. A principal components analysis (SPSS) and varimax rotation were performed. This analysis yielded three factors with eigenvalues greater than 1.0. The factors, identified by items having factor loadings greater than .50, were labeled: Teaching Style, Class Organization, and Student Workload. The factors explained 87% of the total variance of the scores. Table 1 gives the items and their factor loadings for each of the three factors.

Insert Table 1 about here

The TEQ was administered a second time to a sample of 192 students in an undergraduate Educational Psychology course in the School of Education. The sample included 57 males, 127 females, and 8 students who did not complete the demographic items. There were 12 sophomores, 105 juniors, 58 seniors, and 8 graduate students. Nine students did not indicate their educational level.

The TEQ responses were factor analyzed using the same procedures employed in the earlier factor analysis. This analysis yielded three factors with eigenvalues greater than 1.0. The factors explained 83% of the total variance. Thirty-seven of the 41 items (about 90%) retained loading greater .50 on the original factors. Items 2 and 9 loaded initially on Factor I, but had higher loadings on Factor II in the second analysis. Items 40 and 41 loaded on Factor II initially and on Factor III on the second analysis. Table 1 gives the factor loadings for the second analysis.

Finally the TEQ was administered to a stratified random sample of fifty classes across the university. The stratification variables were educational level, rank of instructor, and subject field (physical science, behavioral science, humanities, etc.) Proportional allocation of classes to strata was used so that sample matched the population from which it was drawn. Nine hundred twenty seven students provided data. TEQ data were analyzed used BMDP/4M79. A principal components analysis with varimax rotation was performed. This analysis yielded four factors with eigenvalues greater than 1.0. The factors explained 62% of the total test variance.

The third factor analysis split Factor I (Teaching Skill) into two factors. The first factor measured skilled in conducting class; the second factor measured skill in relating to students. Table 1 summarizes the factor loadings across the three factorial analyses of the TEQ.

Phase 2: Analysis of the Effects of Student and Class Variable an TEQ Ratings

The second phase of the analysis assessed the effect of two student characteristics and two class characteristics on TEQ ratings. Independent variables were student sex, educational level, cumulative grade point average, and expected course grade. The dependent variables were scores on the three factors of the TEQ.

Cluster samples of undergraduate students were randomly selected from the population of all undergraduate classes where professors routinely collect end-of-course ratings. Approximately 35% of the total instructional staff collect end-of-course ratings. The sample included 356 males and 464 females. There were 491 freshmen/ sophomores in the sample and 329 junior/seniors.

Undergraduate students were administered the 43 item TEQ the last week of the spring semester. They also completed a 5 item demographic checklist. Student responses were anonomous and intructors did not receive summaries of the ratings until semester grades were recorded.

Data Analysis

TEQ data were analyzed using a four factor analysis of variance. BMDP2V was the statistical package used for this analysis. The factors were sex, educational level, cumulative grade point average, and expected grade. There were two levels for each factor. The educational factor was divided into upper (junior/senior) and lower (freshmen/sophomore) division students. The cumulative grade point average (gpa) included a low group (1.5 - 2.9) and a high group (3.0 - 3.9). The expected grade factor was divided into students expecting C's D's or F's (low group) and students expecting A's or B's (high group). Table 2 gives the cell sizes for the analysis. Separate analyses were performed for each factor of the TEQ.

Insert Table 2 here

Results

Teaching Skill

The results of the analysis of variance for the Teaching Skill Factor yielded a significant main effect for educational level ($F = 10.61$, $df = 1, 804$, $p < .01$) and expected grade ($F = 43.75$, $df = 1, 804$, $p < .01$) and a significant sex by expected grade interaction ($F = 7.22$ $df\ 1, 804$, $p < .01$). Table 3 gives the analysis of variance summary table for the Teaching Skill Factor.

Insert Table 3 here

The significant main effects showed that upper division students gave significantly higher ratings on the Teaching Skill Factor (X = 51.27) than lower division students (X = 56.10). Lower mean scores indicate higher ratings. (1 = the best I ever had, 5 = below average). Students expecting high grades (A or B) had a significantly higher mean score (X = 48.80) for the Teaching Skill Factor than the students expecting lower grades (X = 58.54).

The significant sex by expected grade interaction showed that females expecting higher grades had a lower mean score (X = 47.55) than males expecting high grades (X = 50.04). Females expecting low grades had a significantly higher mean score (X = 61.31) than male expecting a low grade (X = 55.85) Figure 1 shows the significant sex by expected grade interaction.

Class Organization

The analysis of variance for the Class Organization Factor yielded a significant main effect for educational level ($F = 7.97$, $df = 1,804$, $p < .01$) and expected grade ($F = 37.54$, $df = 1,804$, $p < .01$). Significant educational level by grade point average ($F = 4.18$, $df = 1,804$, $p < .05$) and sex by expected grade ($F = 6.89$, $df = 1, 804$, $p < .01$) interactions were also found. Table 4 gives the analysis of variance source table.

Upper level students had a significantly higher mean score (X = 41.23) than lower division students (X = 44.12) for the Class Organization Factor. Students expecting high grades rated instructors significantly higher (X = 39.55) than students expecting low grades (X = 45.80).

The educational level by grade point average interaction indicated that students across all educational levels with low cummulative grade point averages had similar mean ratings for the Class Organization Factor. The mean for lower division students was 42.75. The mean for upper division students was 42.05. However while upper division students with high gpa's gave higher mean ratings (X 40.51), lower division students with high gpa's gave lower mean scores (X = 45.48) than did students with low gpa's. Figure 2 shows the educational level by gpa interaction.

The sex by expected grade interaction showed that males gave higher mean ratings for Class Organization than did females, that males and females expecting high grades gave instructors higher mean ratings on this factor than students expecting lower grades, and that the difference between male and female mean ratings was greatest for students expecting high grades. Males expecting high grades had a mean class organization score of 30.99; females in this group had a mean of 38.10. Males expecting low grades had a mean of 44.57; females expecting low grades earned a mean of 47.03. Figure 3 shows the sex by expected grade interaction.

The analysis of variance for the Student Workload Factor yielded non-significant results.

Discussion

The validity of student ratings of teacher effectiveness is of central importance to university personnel who are evaluated in part by student ratings. This study suggests that student and class characteristics do influence end-of-course ratings of instructors. Educational level and expected grade were two characteristics that affected ratings

of instructors. Upper division students (juniors and seniors) as a group assigned higher ratings than lower division students. Students expecting to earn A's or B's in a course rated their instructors higher than students expecting C's, D's, or F's. Expected grade was also found to interact with sex. Females expecting high grades rated their instructors higher on Teaching Skill and lower on Class Organization than males expecting high grades. Females expecting low grades rated their instructors lower than did males expecting low grades on both the Teaching Skill and Class Organization Factors.

The results of this study are consistent with previous research which identified educational level and expected grade as factors which influence end-of-course evaluations. Upper division courses are most likely to be elective and instructors of elective courses are given higher ratings than students of required courses (Centra, 1978; Gage, 1961; Lovell & Haner, 1955; Pohlman, 1975). Recent research (Hoffman, 1978; Worthington & Wong, 1979) also has shown expected grade to be factor in the ratings students assign faculty person.

Evaluation of teaching as it is presently conducted is, as Scriven (1980), notes, "so shoddy at the intellectual and practical level, that is hardly surprising that teaching is rewarded in an inappropriate way" (pg 9). Student ratings are the usual source of data for the evaluation of teaching and little is known about the variables that affect student ratings of instructors. This study suggests that differences in faculty ratings may be explained by factors other than differences in the use of effective instructional methodologies. If student and class characteristics do affect end-of-course ratings, the extent and magnitude of these effects need to be identified so that student ratings can be used appropriately in faculty evaluation.

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Table 1

Factor Loading for Three Factors Measured by the Teacher Effectiveness Questionnaire

Factor I: Teaching Style	Loading(A)	Loading(B)	Loading(C)	
1. has command of the subject matter	.59	.65	.71	
2. clearly explains the objectives of the course and the methods to be used to realize them	.62		.59	
3. successfully communicates subject matter	.76	.66	.68	
4. is sensitive to the response of the class	.66	.64		.56
5. answers impromptu questions from students clearly and satisfactorily	.73	.68	.54	
6. explains concepts clearly and explanations are easy to understand	.64	.54	.64	
7. gives interesting lectures	.75	.66	.67	
8. realizes when the students are bored or confused	.64	.56		
17. is prepared for class	.59	.52	.71	
20. has the course well planned	.60		.65	
21. encourages students to ask questions in the class	.66	.65		.65
23. is interested in the subject matter taught	.65	.74	.64	
25. is interested in students	.70	.72		.77
26. encourages students to express their opinions in this class	.70	.73		.75
27. shows an interest in students	.73	.72		.78
28. is personable and has a sense of humor	.83	.82		.74
29. maintains a friendly and informal class atmosphere	.80	.73		.77

Table 1 (continued)

is enthusiastic about the course	.74	.84	.60	
gives interesting classroom presentations	.73	.74	.64	
is dynamic and energetic	.71	.51	.52	
is friendly	.71	.51		.76
listens attentively to what students have to say	.65	.56		.67
how would you rate the overall	.76	.63	.59	

Factor II: Class Organization

	Loading(A)	Loading(B)	Loading(C)
returns homework and assignments promptly	.58	.56	.58
provides meaningful critiques of students' efforts	.62	.58	.64
keeps students informed about their progress	.67	.62	.66
compliments good work and criticizes poor work	.62	.45	.62
clearly states assignments and due dates are exactly specified	.69	.66	.65
has everything going according to schedule	.64	.66	.58
specifies objectives for the course	.55	.59	.51
achieves the objectives of the course	.62	.74	.50
has required reading materials readily available to students	.59	.56	.37
uses text books which are interesting and well written	.54	.53	.28
has high standards for student performance	.55		
how would you rate your instructor's overall teaching ability?	.56		

Table 1 (continued)

Factor III Student Workload			
Item	Loading(A)	Loading(B)	Loading(C)
is available to students outside of class	.66	.52	
has students do more work in this class than in other classes	.64	.76	.79
requires more work than the students could get done	.71	.83	.82
continually emphasizes grades	.54	.69	.64
maintains definite standard of student performance		.48	.39
has high standards for student performance		.58	.56

A = The first factor analysis, n = 282
B = The second factor analysis, n = 192
C = The third factor analysis, n = 927

Table 2

Cell frequencies for the Four Factor Analysis of Variance

Sex	Educational Level	GPA	Expected Grade	Frequency
Male	Lower	Low	High	62.
Male	Lower	Low	Low	32.
Male	Lower	High	High	65.
Male	Lower	High	Low	13.
Male	Upper	Low	High	77.
Male	Upper	Low	Low	27.
Male	Upper	High	High	72.
Male	Upper	High	Low	8.
Female	Lower	Low	High	81.
Female	Lower	Low	Low	40.
Female	Lower	High	High	166.
Female	Lower	High	Low	32.
Female	Upper	Low	High	37.
Female	Upper	Low	Low	16.
Female	Upper	High	High	76.
Female	Upper	High	Low	16.

Table 3

Analysis of Variance Source Table for the Teaching Skill Factor

Source			
Sex	1	247.47494	1.01
Level	1	2613.60122	10.61**
GPA	1	45.45450	0.18
Exp. Grade	1	10772.43121	43.75**
Sex x level	1	79.02285	0.32
Level x GPA	1	11.98968	0.05
Sex x Ex. Grade	1	416.94381	1.69
Level x Ex Grade	1	1776.97754	7.22**
GPA x Ex Grade	1	2.80030	0.01
Sex Level x GPA	1	32.57637	0.13
Sex x Level x Ex Grade	1	122.74141	0.50
Sex x GPA x Ex Grade	1	588.99088	2.39
Level x GPAx £x Grade	1	2.92963	0.01
Level X GPAx Ex Grade	1	50.14932	0.01
Sex x level x Ex Grade	1	0.41594	0.00
Error	804	246.22377	

** $p < .01$

Table 4

Analysis of Variance Source Table for the Class Orgnization Factor

Source	Degrees of Freedom	Mean Square	F
Sex	1	5.45695	0.05
Level	1	935.49503	7.97**
GPA	1	45.39084	0.39
Exp. Gr	1	4405.30086	37.54**
Sex x Level	1	14.10667	0.12
Sex x gpa	1	9.82358	0.08
Level x gpa	1	490.01423	4.18*
Sex x expected grade	1	808.89343	6.89**
Level x expected grade	1	4.41048	0.04
gpa x expected grade	1	34.62923	0.30
Sex x levels x gpa	1	112.32856	0.96
Sex x level x expected grade	1	306.02483	2.61
Sex x gpa x expected grade	1	21.48011	0.18
Level x, gpa x expected grade	1	12.16553	0.10
Sex level x gpa x expected	1	23.96496	0.20
Error	804	117.35013	

* $p < .05$
** $p < .01$

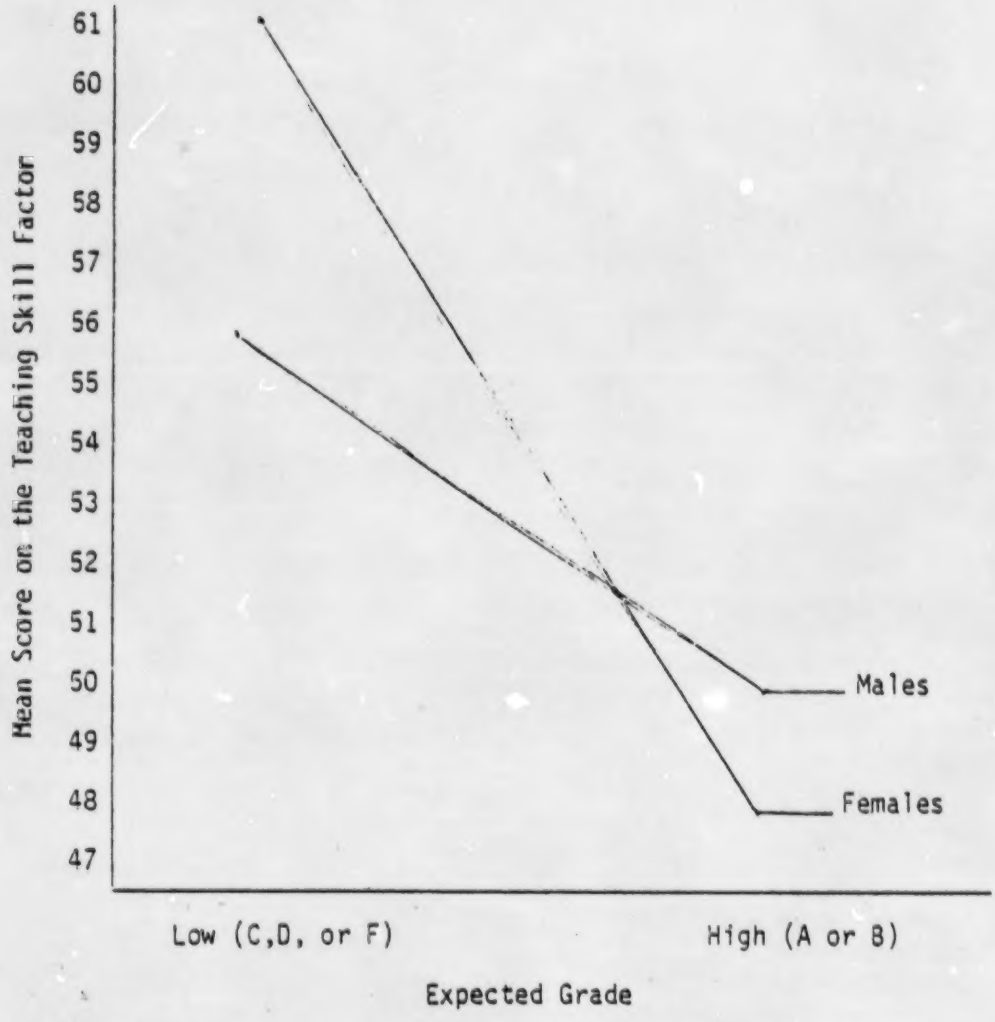

Figure 1: Results of the Sex by Expected Grade Interaction for the Teaching Skill Factor.

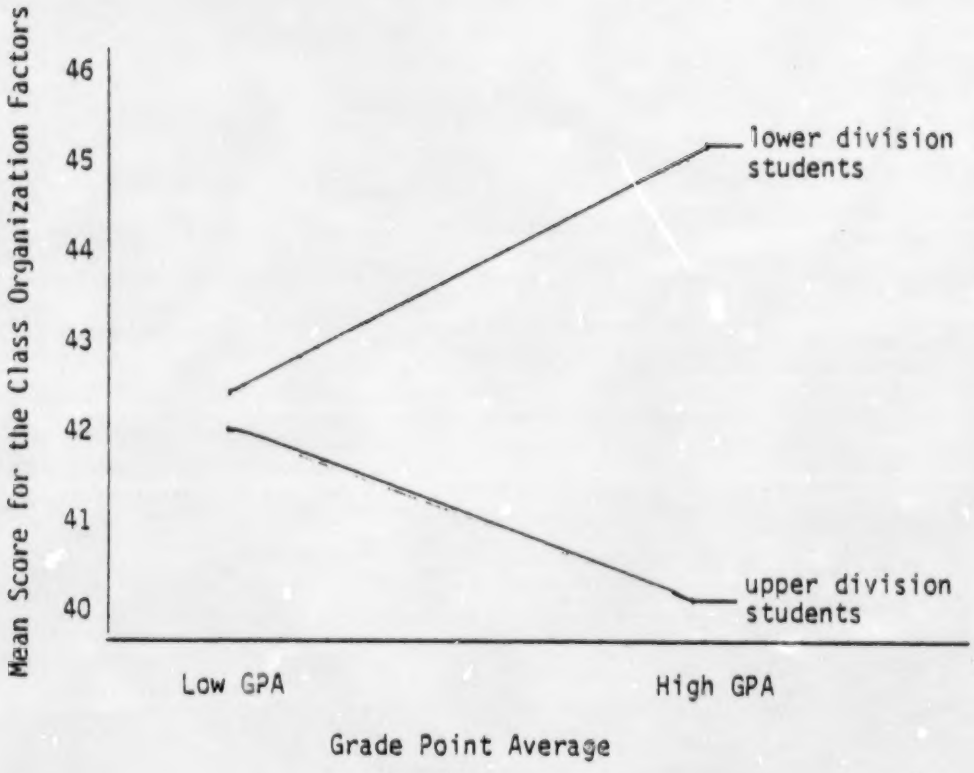

Figure 2: Results of the Educational Level by Grade Point Average Interaction for the Class Organization Factor.

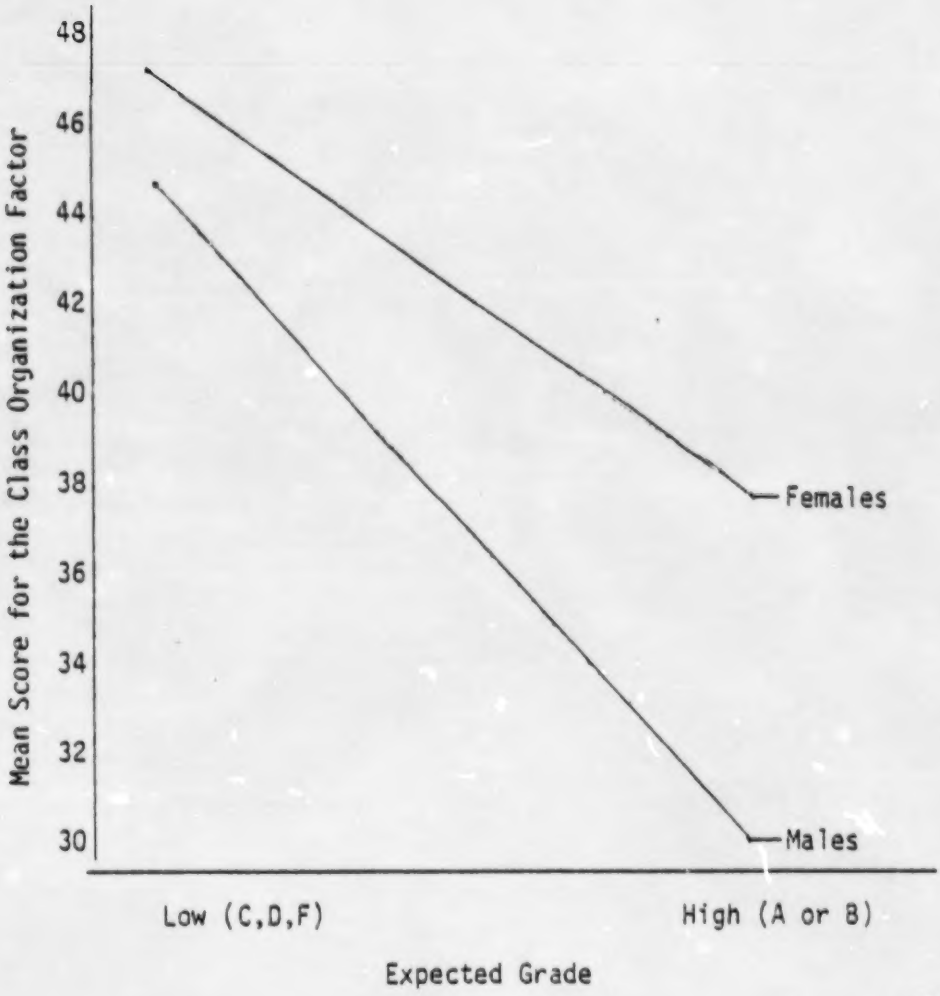

Figure 3: Results of the Sex by Expected Grade Interaction for the Class Organization Factor.